

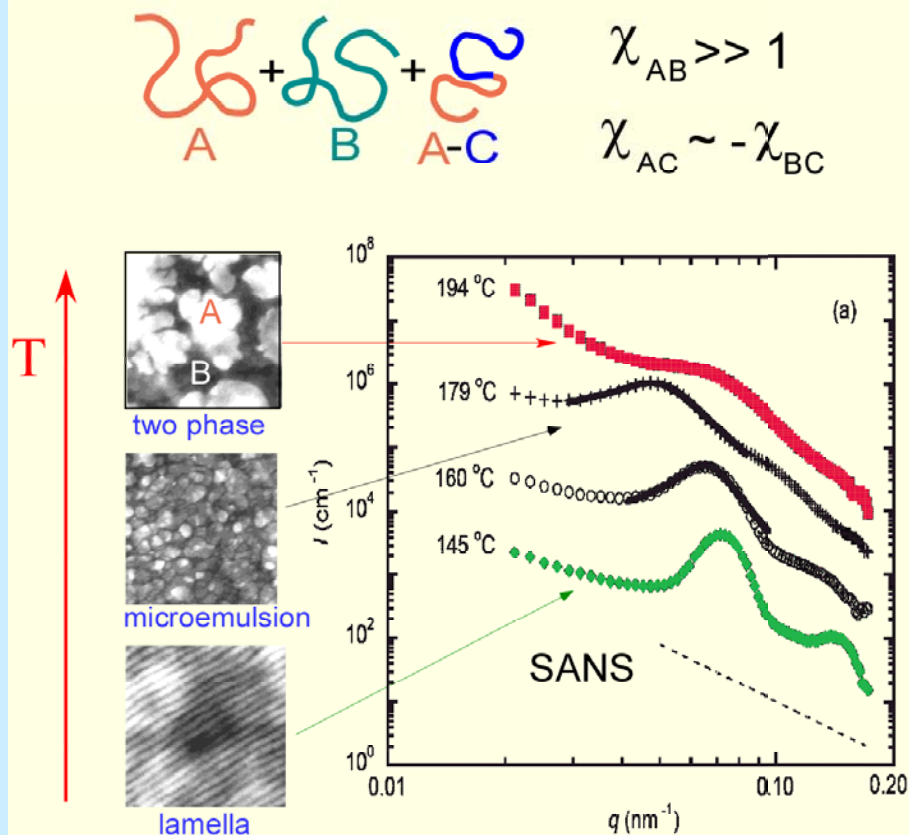
Stabilizing Highly Immiscible Polymer Blends

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The immiscibility of all commercially important polymers severely restricts the blending of polymers to achieve desired properties as well as the recycling of commingled plastic waste. We have been successful in demonstrating principles for selecting block copolymers that stabilize blends of even highly immiscible polymers that may lead to new, more effective polymer processing and recycling strategies.

We have studied the phase behavior of mixtures of polyethylene (PE), polyisobutylene (PIB), and a PE-polypropylene (PP) block copolymer with SANS, LS and TEM. The measurements provide strong support for the concept that immiscible homopolymers A and B, can be stabilized by an A-C block copolymer provided that the C-block is chosen in a manner that balances the attractive and repulsive interactions between the copolymer and the A-rich and B-rich phases. Our work represents the first application of surfactant design principles, proposed by Khalweit and coworkers for aqueous mixtures, to blends of macromolecules.



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